

Claims:

What is claimed is:

1. A photocatalyst sheet characterized in that it comprises:
a substrate;
a first fluorocarbon resin layer coated on said substrate;
a second fluorocarbon resin layer containing a photocatalyst coated on said first fluorocarbon resin layer; and
a third fluorocarbon resin layer containing a photocatalyst coated on said second fluorocarbon resin layer.
2. A photocatalyst sheet characterized in that it comprises:
a substrate;
a first fluorocarbon resin layer coated on said substrate;
a second fluorocarbon resin layer containing a photocatalyst coated on said first fluorocarbon resin layer; and
a third fluorocarbon resin layer containing a photocatalyst coated on said second fluorocarbon resin layer.
3. A photocatalyst sheet as set forth in claims 1 or 2, characterized in that said substrate comprises a fiber surface of which may be either smooth, or rough, or mesh-like.
4. A photocatalyst sheet as set forth in any one of claims 1 - 3, characterized in that said substrate is a glass fiber, said first fluorocarbon resin layer is PTFE (Polytetrafluoroethylene), said second fluorocarbon layer is FEP (Tetrafluoroethylene-hexafluoropropylene copolymer) or PFA (Tetrafluoroethylene-perfluoroalkylvinylether copolymer), and said third fluorocarbon resin layer is FEP.
5. A photocatalyst sheet as set forth in any one of claims 1 - 3, characterized in that said substrate is a glass fiber, said first fluorocarbon resin layer is PTFE, said second fluorocarbon resin layer is either PTFE, or FEP or PFA, and said third fluorocarbon resin layer is

FEP.

6. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that the melting point of said first fluorocarbon resin layer is higher than the melting points of said second and the third fluorocarbon resin layers, and the melting point of said second fluorocarbon resin layer is either higher than, or as high as, that of said third fluorocarbon resin layer.

7. A photocatalyst sheet as set forth in claim 6, characterized in that said second and the third fluorocarbon resin layers comprise the identical fluorocarbon resin.

8. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that the melting point of said first fluorocarbon resin layer is higher than the melting points of said second and the third fluorocarbon resin layers, and the melting point of said first fluorocarbon resin layer is either higher than, or as high as, that of said fluorocarbon resin second layer.

9. A photocatalyst sheet as set forth in claim 8, characterized in that said first and the second fluorocarbon resin layers consist of the identical fluorocarbon resin.

10. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that said first and the third fluorocarbon resin layers consist of the identical fluorocarbon resin.

11. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that the melting point of said third fluorocarbon resin layer is higher than the melting points of said first and the second fluorocarbon resin layers, and the melting point of said second fluorocarbon resin layer is either higher than, or as high as, that of said first fluorocarbon resin layer.

12. A photocatalyst sheet as set forth in claim 11, characterized in that said first and the second fluorocarbon resin layers comprise the identical fluorocarbon resin.

13. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that the melting point of said third fluorocarbon resin layer is higher than the melting points of said first and the second fluorocarbon resin layers, and the melting point of said third fluorocarbon resin layer is either higher than, or as high as, that of said second fluorocarbon resin layer.

14. A photocatalyst sheet as set forth in claim 11, characterized in that said second and the third fluorocarbon resin layers consist of the identical fluorocarbon resin.

15. A photocatalyst sheet as set forth in claim 1 or 2, characterized in that said photocatalyst contains the titanium oxide (TiO_2 , TiO_3).

16. A photocatalyst sheet as set forth in any one of claim 1, 2 or 15, characterized in that said photocatalyst, at least partly, is exposed on said third fluorocarbon resin layer.

17. A photocatalyst sheet as set forth in any one of claim 1, 2, 15, or 16, characterized in that the content of said photocatalyst in said third fluorocarbon resin layer is within the range of 10 – 60 % by weight.

18. A photocatalyst sheet as set forth in any one of claims 1 – 17, characterized in that the surface of the fluorocarbon resin layer containing said photocatalyst of said photocatalyst sheet is water-repellant.

19. A photocatalyst sheet comprising:

a substrate;
a fluorocarbon resin layer coated on said substrate; and
at least an uppermost layer coated with a fluorocarbon resin layer containing a photocatalyst; and
is characterized in that a surface of said fluorocarbon resin layer containing a photocatalyst is water-repellant.

20. A photocatalyst sheet as set forth in any one of claims 1 - 19, characterized in that said photocatalyst has a part exposed on the fluorocarbon resin layer as said uppermost layer or on said third fluorocarbon resin layer.

21. A photocatalyst sheet as set forth in any one of claims 1 - 20, characterized in that the photooxidation ability of the surface of said fluorocarbon resin layer containing the photocatalyst is such that, when oleic glyceride is coated on said surface of fluorocarbon resin layer, and an ultraviolet light is irradiated onto said surface by $1\text{mW}/\text{cm}^2$, the rate of decomposition of said oleic glyceride is $0.1\text{mg}/\text{cm}^2$ day or more.

22. A photocatalyst sheet as set forth in any one of claims 1 - 20, characterized in that the photoreduction ability of the surface of said fluorocarbon resin layer containing the photocatalyst is such that, when said photocatalyst sheet is soaked in the 0.1N (normal) silver nitrate aqueous solution, and an ultraviolet light is irradiated for one minute onto the surface of said fluorocarbon resin layer containing the photocatalyst by $1\text{mW}/\text{cm}^2$, the color difference change is $\Delta E^* \geq 1$.

23. A photocatalyst sheet as set forth in any one of claims 1 - 20, characterized in that the contact angle of the surface of said fluorocarbon resin layer containing the photocatalyst is about 90 degrees or more.

24. A photocatalyst sheet as set forth in any one of claims 1 - 23, characterized in that the thickness of said fluorocarbon resin layer

containing the photocatalyst is 1 μ m or more.

25. A manufacturing method of a photocatalyst sheet including:

a process to coat an uppermost layer of a substrate with a fluorocarbon resin layer containing the photocatalyst; and characterized in that the surface of said fluorocarbon resin layer containing the photocatalyst is water-repellant.

26. A manufacturing method of a photocatalyst sheet comprising:

a process of coating a first fluorocarbon resin layer on a substrate;

a process of coating a second fluorocarbon resin layer on said first fluorocarbon resin layer; and

a process of coating a third fluorocarbon resin layer containing a photocatalyst on said second fluorocarbon resin layer.

27. A manufacturing method of a photocatalyst sheet comprising:

a process of coating a first fluorocarbon resin layer on the substrate;

a process of coating a second fluorocarbon resin layer containing a photocatalyst on said first fluorocarbon resin layer; and

a process of coating a third fluorocarbon resin layer containing a photocatalyst on said second fluorocarbon resin layer.

28. A manufacturing method of a photocatalyst sheet as set forth in claim 26 or 27, characterized in that the surface of said fluorocarbon resin layer containing photocatalyst is water-repellant.

29. A manufacturing method of a photocatalyst sheet as set forth in any one of claims 26 – 28, characterized in that coating processes are continuous for said first fluorocarbon resin layer, said second fluorocarbon resin layer, either containing or not containing the

photocatalyst, and said third fluorocarbon resin layer containing the photocatalyst.

30. A manufacturing method of a photocatalyst sheet as set forth in any one of claims 26 – 29, characterized in that a coating process is such that first preparing said first and the second fluorocarbon resin layers and then coating the third fluorocarbon resin layer containing the photocatalyst.

31. A manufacturing method of a photocatalyst sheet as set forth in any one of claims 26 – 30, characterized in that the coating process of said third fluorocarbon resin layer containing the photocatalyst consists of:

- a coating process of the dispersion for fluorocarbon resin containing titanium oxide fine particles as the photocatalyst;

- a drying process;

- a sintering process at the temperature higher than the melting point of the resin for said third fluorocarbon resin layer; and

- a process to make said photocatalyst exposed on the surface of said third fluorocarbon resin layer.